

# Real-Time Optimization for Control of Mechatronic Systems

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Model Predictive Control (MPC) is a powerful feedback control technique that is based on the fast online solution of optimal control problems in real-time. With dedicated algorithms, solution times can be brought down to the millisecond timescale, so that MPC is becoming feasible for applications in mechatronics, like control of combustion engines, machine tools, or robot arms. The MPC problems can particularly fast and reliably be solved if they are convex, and special emphasis must be put into a careful problem formulation. In this talk, we outline recent progress on both the formulation of convex MPC problems as well as the fast and reliable solution of MPC problems. We particularly discuss the problem of time optimal robot control and show results obtained at a robot arm at KU Leuven.